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A New Crawfish of the Virilis Section of the Genus *Orconectes* (Decapoda, Astacidae)

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At the time the manuscript of a paper on the genus *Orconectes* in Louisiana (Penn, 1952) was submitted for publication there remained in the Tulane collections several lots of crawfishes of this genus represented only by females and second form males which could not be placed in any known species. With the recent acquisition of additional specimens, including one first form male, it was obvious that these represented an undescribed species.

This new species is being named in honor of Dr. Edward Sturtevant Hathaway on the occasion of his promotion to the rank of emeritus professor of zoology after twenty-six years as professor and chairman of the department of zoology at Tulane University. I have been especially indebted to Dr. Hathaway for many years, not only for the first formal training in zoology which I received in his classes, but also more recently as a colleague to whom he has been most generous in giving freely from his copious store of experience and wisdom in dealing with the foibles of college students. As a small token of my esteem it is a pleasure to name this new species for him.

Orconectes (Orconectes) hathawayi, n. sp.

Holotype male, form I. Body subovate, depressed; abdomen about equal to length of cephalothorax (37.0-36.5 mm.). Height of cephalothorax (Fig. 1 and 2) less than width in region of caudodorsal margin of cervical groove (12.0-18.0 mm.); greatest width of cephalothorax slightly caudad of caudodorsal margin of cervical groove.

Areola (i.e., thoracic portion of cephalothorax on middorsal line) linear, obliterated. Cephalic portion of cephalothorax about two and one-third times

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as long as areola; length of areola about 30.2 per cent of entire length of cephalothorax.

Rostrum long, excavate; sides slightly converging anteriorly to base of acumen which is set off by acute, divergent, dorsolaterally projecting spines. Acumen with apex curved dorsad, slightly less than half the length of the remainder of the rostrum (4.0-10.0 mm.). Margins of rostrum raised, somewhat swollen and keeled along dorsal edges; upper surface smooth with small setae concentrated near margins where they are prominent.

Postorbital ridges well-developed, grooved laterad and terminating cephalad in strong, divergent lateral spines. Branchiostegal spine fairly strong. One strong acute lateral spine projecting anterolaterally from each side of cephalothorax just caudad of the cervical groove; upper surface of cephalothorax with numerous setiferous punctations; lateral portions ventrad of position of the lateral spines coarsely granulate.

Cephalic section of telson with two widely-spaced strong spines in caudo-lateral corners.

Epistome (Fig. 3) slightly less than twice as long as wide, with raised margins; cephalic margin emarginate mesially.

Antennae reaching to middle of abdomen. Antennal scale narrow (Fig. 4), widest near middle; lateral margin terminating in a sharp spine; total length slightly less than length of the areola (10.0-11.0 mm.). Entire median margin fringed with hair.

Left chela (Fig. 5) with palm somewhat inflated and fingers depressed; outer margin of immovable finger and palm produced into a definite, broadly-rounded keel; setiferous punctations present over dorsal surface of most of palm and both fingers; inner margin of palm with two rows of conspicuous tubercles, the inner row consisting of eight, the outer row of six. Both fingers terminating in short corneous tips bent toward each other, that of the dactyl (i.e., the moveable finger) overhanging the other when fingers are closed. Nine rounded tubercles at base and one distally-located pointed tubercle on opposable margin of immovable finger; six rounded tubercles in corresponding positions on the dactyl. Upper surface of dactyl with two rows of strong tubercles basally.

Carpus (Fig. 5) with six strong spines on distal end in a semicircular arrangement extending medioventrally from dorsal to ventral condyles which articulate with the chela; the two most ventrally located spines exceptionally strong.

Hooks (Fig. 6) present on ischiopodites of third pereopods only; length of hook equal to about half the diameter of the base of the ischiopodite.

First pleopods (Fig. 7, 8 and 9) reaching to cephalic side of coxopodite of third pereopods when abdomen is *flexed*. Tip terminating in two parts.

Central projection corneous, short, stout and straight with cephalic margin curved caudad at apex. Apex with a small caudoventral notch which distinguishes the tips of the centrocephalic and centrocaudal elements of the projection. Mesial process non-corneous, stout, shorter than central projection, and slightly recurved caudad at apex; apex somewhat flattened transversely.

Morphotype male, form II. Differs only slightly from the holotype in general appearance. Hooks on ischiopodites of third pereiopods much reduced. First pair of pleopods (Fig. 10, 11 and 12) reaching to center of coxopodite of second pair of pereiopods when abdomen is flexed; without corneous tip on central projection; tips separated only at their extreme apices. Central projection short, stout, with cephalic margin curved caudad at apex; mesial process short, stout, apex enlarged and slightly recurved caudad.

Allotype female. Similar to holotype in general appearance. Annulus ventralis (Fig. 13) immovable, subspindle-shaped, with greatest length in transverse axis. With an anteromedian depression; sinus originates near sinistral margin of depression extending from there dextrad to a little beyond the median line and then makes a sharp turn sinistrad back to the median line where it turns caudad and follows a slightly undulating course to the caudal margin of the annulus.

Measurements. As follows, in millimeters:

	Holotype	Allotype	Morphotype
Cephalothorax:			
Length	36.5	34.0	35.0
Width	18.0	17.0	16.5
Height	12.0	14.0	13.5
Areola: Length	11.0	11.0	11.0
Rostrum:			
Length	10.0	9.5	9.0
Width at base	5.5	5.0	5.0
Abdomen: Length	37.0	35.0	35.5
Chela:*			
Length of outer margin			
of hand	36.5	27.0	31.0
Length of dactyl	24.0	17.0	20.0
Length of inner margin			
of palm	10.0	7.5	8.5
Width of palm	14.0	10.0	11.0

*The right chela is regenerated on both the holotype and allotype, thus these measurements are for the left chela on these two, but for the right chela of the morphotype.

Type Locality. The holotype was collected from Spring Creek, 5.1 mi. east of Hineston (on Louisiana state highway 85), Rapides Parish, Louisiana on August 26, 1951 by Charles D. Hancock, an undergraduate student at Tulane University. Spring Creek is a tributary of Bayou Cocodrie which is part of the Atchafalaya River system. At the collecting site Spring Creek is a small, clear, shallow stream with a sand and gravel bottom, no aquatic vegetation and shaded banks.

The allotype and morphotype were collected, along with eleven other immature males and twelve females, from the ponds of the Beechwood Fish Hatchery, 3 mi. north of Forest Hill (on U.S. highway 165), Rapides Parish, Louisiana in March, 1941 by Percy Viosca, Jr. The water supply for the hatchery ponds was obtained from Indian Creek across which a dam had been built. Undoubtedly these crawfishes entered the ponds with the water supply from the creek. Indian Creek is a tributary of Bayou Boeuf which is also part of the Atchafalaya River system.

Disposition of Types. The holotypic male, the allotypic female and the morphotypic male form II, are deposited in the United States National Museum, no. 92998, 92999, and 93000 respectively. From the paratypic series, one male form II and one female each from the Beechwood Fish Hatchery series listed above are deposited in the Museum of Comparative Zoology, the Carnegie Museum, the Academy of Natural Sciences at Philadelphia, the Museum of Zoology of the University of Michigan, the American Museum of Natural History, and in the personal collection of Dr. Horton H. Hobbs, Jr. at the University of Virginia. Ten second form males, three juvenile males, six females, and seven juvenile females are retained in the Tulane University collection.

Specimens ' Examined. Forty-eight paratypes of *Orconectes hathawayi* in addition to the three types have been examined from four localities in Rapides Parish, Louisiana. These records and a summary of their deposition are as follows:

Spring Creek near Longleaf, August 15, 1925, Percy Viosca, Jr. (TU P-597). [Spring Creek near] Longleaf, [undated], So. Biol. Supply Co. (USNM 60274). Beechwood Fish Hatchery, 3 mi. north of Forest Hill, March, 1941, Percy Viosca, Jr (USNM , MCZ , CM, ANSP, UMMZ, AMNH, HHH, TU P-835).

Spring Creek, 5.1 mi. east of Hineston, August 26, 1951, C. D. Hancock (USNM).

Spring Creek at Melder, August 26, 1951, C. D. Hancock (TU 2558).

Paratype Series. Little variation was observed in the paratype series other than that expected in association with immaturity. The only measurements taken were total length of cephalothorax, length of cephalic portion of cephalothorax and length of areola. The length of the areola expressed as

"per cent of total length of the cephalothorax" showed the following variation. March collection: males, range from 29.2 to 30.8, average 29.9; females, range from 27.4 to 32.2, average 30.1; August collections: males, range from 24.2 to 28.6, average 27.2; females, range from 25.7 to 28.8, average 27.5.

Ecology and Life History Notes. Apparently this is a clear stream species and should be expected to occur in the smaller sand- and gravel-bottomed head-water creeks of the Calcasieu, Mermentau and Atchafalaya river systems. At present it is known only from the latter.

The only first form male was taken in August, other collections from March and August contained only second form males, females and juveniles of both sexes. With the exception of the lone first form male the specimens making up the August collections consisted of nine males and seven females all ranging between 12.5 and 22.5 mm. cephalothorax lengths. The specimens making up the March collection, obviously nearer maturity, consisted of twelve males and fourteen females ranging between 18.2 and 35.0 mm. cephalothorax lengths. Although these data are sparse I would guess that this species carries eggs in April and May.

Relationships. I am tentatively placing *O. bathawayi* in the *Virilis* section of the genus although it is not a perfect fit according to the diagnosis as written by Ortmann (1931). Within the *Virilis* section it is undoubtedly most closely related to *O. difficilis* (Faxon) which Ortmann (*I. c.*) placed in the *Palmeri* group. The two species, *difficilis* and *bathawayi*, apparently represent intermediate or transitional positions between the *Virilis* and *Limosus* sections; on the basis of the forms of their first pleopods alone they show affinities to the *Limosus* section, but on other structures such as the obliterated areola and characteristic chela they are closest to members of the *Palmeri* group of the *Virilis* section. *O. bathawayi* can be separated easily from *difficilis* (Fig. 14) on the basis of the first pleopod of the form I male, the rami being a great deal longer and more curved caudad in *difficilis* than in *bathawayi*.

Literature Cited

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P l a t e I

Orconectes (Orconectes) hathawayi, n. sp.

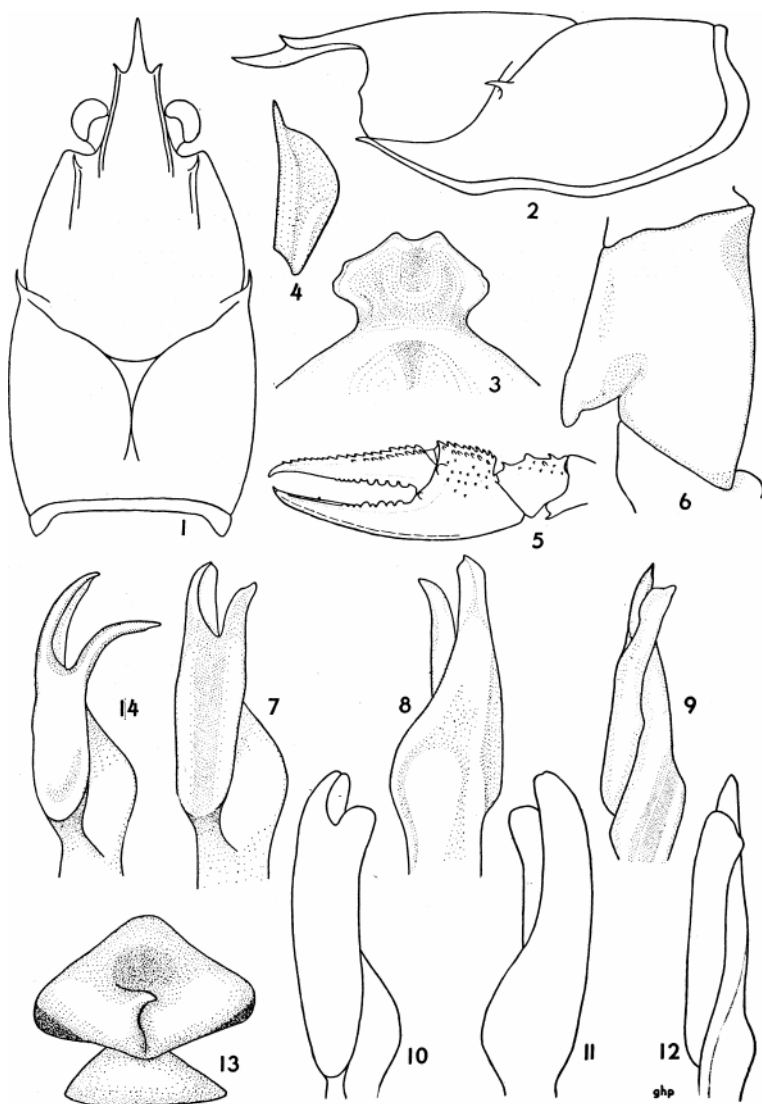
1. Dorsal view of cephalothorax of holotype.
2. Lateral view of cephalothorax of holotype.
3. Ventral view of epistome of holotype.
4. Dorsal view of antennal scale of holotype.
5. Upper surface of left chela and carpus of holotype.
6. Ischiopodite of third pereopod of holotype.
7. Mesial view of first pleopod of holotype. &
Lateral view of first pleopod of holotype.
9. Caudal view of first pleopod of holotype.
10. Mesial view of first pleopod of morphotype.
11. Lateral view of first pleopod of morphotype.
12. Caudal view of first pleopod of morphotype.
13. Annulus ventralis of allotype.

Orconectes (Orconectes) difficilis (Faxon)

14. Mesial view of first pleopod of male, form I, from Sallisaw Creek, 4 mi. sw. Sallisaw, Sequoyah Co., Oklahoma, January 19, 1950, A. P. Blair (Collection of H. H. Hobbs).

Pubescence removed from all structures figured.

Plate 1



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